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S P E C I F I C A T I O N

OF

JAMES LEE HANNAH.

SURGICAL INSTRUMENTS.

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Surgical Instruments.

HANNAH'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JAMES LEE HANNAH, Doctor of Medicine, of the Town of Brighton, in the County of Sussex, send greeting.

WHEREAS His most Excellent Majesty King William the Fourth, by His
5 Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Sixteenth day of June, in the fourth year of His reign, did, for Himself, His heirs and successors, give and grant unto me, the said James Lee Hannah, Doctor of Medicine, His especial licence that I, the said James Lee Hannah, Doctor of Medicine, my exors, admors, and assigns, or such
10 others as I, the said James Lee Hannah, Doctor of Medicine, my exors, admors, and assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, and also within all His Majesty's
15 Colonies and Plantations abroad, my Invention of "AN IMPROVEMENT OR IMPROVEMENTS IN SURGICAL INSTRUMENTS FOR REMOVING THE STONE IN THE BLADDER, AND ENABLING THE PATIENT TO PASS IT OFF THROUGH THE URETHRA ; in which said Letters Patent there is contained a proviso obliging me, the said James Lee Hannah, Doctor of Medicine, by an instrument in writing under
20 my hand and seal, particularly to describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, and to cause the same to be enrolled in His Majesty's High Court of Chancery within six

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calendar months next and immediately after the date of the said recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said James Lee Hannah, Doctor of Medicine, do hereby declare that the nature 5 of my said Invention, and the manner in which the same is to be used, is described and ascertained as follows, that is to say:—

An Improvement or Improvements in Surgical Instruments for Removing the Stone in the Bladder and enabling the Patient to pass it off through the Urethra. The apparatus which constitutes the improvements may be divided, 10 for distinct comprehension, into two divisions, namely, the one which enters the bladder, and the other that remains without.

The parts entering the bladder have a general resemblance of form to the instruments denominated a sound and a catheter, as seen in Figure 1 of Plate A. These parts entering the bladder are of three different kinds, as 15 seen closed in Figures 1, 8, and 10, of Plate A. Figure 1 is for cutting or dividing the stone in the bladder, and therefore denominated a cutter; Figure 8, for crumbling or crushing it there; Figure 10, for crumbling or crushing it also. Both of these may therefore be called crumblers or crushers. The cutter is formed of the best wrought steel, by making the curved portions 20 of the instrument of two nearly equal and similar parts, as seen in Figure 2, Plate A (where the instrument is represented as open in the bladder), and placing them in lateral contact with each other. At the point of the instrument which enters the bladder these two parts are secured to each other by means of a screw or a rivet (as seen in Figure 2 of Plate A), and form a joint 25 of very easy motion. One of these parts of the curve (that one which the other appears as if it had been cut from) is a continuity of the handle or shaft of the instrument, as seen in Figure 2. This shaft or handle is from the curve about nine inches long, more or less, according to the size of the instrument suitable to a man or to a boy. These two sections of the curve of the 30 instrument have each an edge similar to the two blades of a pair of shears, one section with its edge below, and the other with its edge above, as they close on each other and divide the intermediate substance. At the extremity of the less section, opposite the extremity which is secured by a rivet or a screw, there is a little transverse portion that perhaps might be called an arm, which, 35 when the instrument is closed, rests across the shaft, where it lodges into a little notch or recess cut to receive it (as seen in Figure 2, Plate A), so that all the parts may be properly smooth to pass through the urethra and into the bladder. The purpose of this little arm is for attaching or securing to it;

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by means of a screw or a rivet, a flexible steel spring similar to what is called the main spring of a watch, which steel spring is of sufficient length, say, fifteen or sixteen inches (more or less) to allow of its being pushed into the bladder far enough to separate the two curved parts of the instrument
5 sufficiently from each other (as is seen in Figure 2 of Plate A) to enable the surgeon to inclose the stone between them. To the outer extremity of this flexible steel spring a steel or other metallic plate, about an inch long, half an inch broad, and an eighth of an inch thick, is secured by a removable screw. At the other end of this little metallic plate is a hole or eye (as seen
10 in Figure 2 of Plate A) about a quarter of an inch diameter, to receive a hook through the whole length of the handle or shaft before-mentioned, and immediately under the flexible spring there is a groove or canal, about an eighth of an inch deep and as broad. It is for the purpose of injecting and discharging the bladder through it at about two inches and a half (more
15 or less according to circumstances of fitness to the patient's size, whether boy or man). From the outer extremity of the shaft or handle an oblique cut is made into this canal towards the curve, and at an angle of about forty-five degrees, equal in breadth and depth to the principal canal; into this oblique cut or short groove a pipe or tube reflected or bent downwards from a syringe
20 or a bag is inserted, and the bladder thus injected. The flexible steel spring is, with the shaft or handle of the instrument, inclosed in a thin silver or other metallic tube or case, which goes down quite into the bladder, fits closely on its contents and slides easily on them by applying the fingers to the rim that surrounds its outer extremity from the curve of the instrument, as is
25 seen in Figure 2, of Plate A. In the silver tube there is a lateral orifice corresponding with the little transverse canal or groove in the shaft when the tube is in its place. After this silver case or tube is drawn over the shaft and the steel spring, then the little metallic plate before described is to be screwed on to the extremity of the steel spring, as it is seen in Figure 2, of Plate A.

30 Of the second kind of the parts of the apparatus which enter the bladder, Figure 8, in Plate A, represents the crumbler or crusher with two ranges of teeth, as is more distinctly seen in Figure 9, of Plate A, where the instrument is represented open or having its ranges of teeth separated from each other. This crumbler (made also of the best of wrought steel) Figure 9, Plate A,
35 has the convex part of the shaft portion of the curve serrated or cut into three or four rows of teeth in the whole direction of the curve from about half an inch from its inner extremity or joint to the termination of the curve on the shaft, as seen in Figure 9, referred to; the other row of teeth on the moveable section of the curve, (and which may be designated the moveable

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teeth), are cut only transversely on the corresponding concave surface of the curve, as seen in Figure 9, Plate A, and fit in smoothly between those with which they come in contact, as is seen in Figure 8, of Plate A. This portion of the instrument forming the moving range or row of teeth has about half an inch of its extremity filed laterally, and drilled to form a tongue to be let in 5 at the extremity of the movable row of teeth, so as to be screwed or riveted together (as seen in Figure 9, of Plate A), and thus form a joint of easy motion, which joint serves as a fulcrum in the use of the instrument and renders it very powerful in its effect. To the other extremity of the moving range of teeth the same kind of flexible steel spring as used with the cutter is 10 secured by a screw or a rivet and made perfectly smooth. The shaft or handle of this crumbler is grooved like that of the cutter before described, and is in all respects similar to it, except that it is without the little transverse notch which the other must have. The flexible steel spring is let in (equal to its thickness) to the extremity of the moving range of teeth, as seen in 15 Figure 9, Plate A. It is then nicely screwed or riveted on to its place, and no roughness or pointedness perceptible.

The third kind of the parts of the apparatus which enter the bladder is this second kind of crumbler or crusher (made of the same material as the other) shewn by Figures 10 and 11, Plate A. It differs from the other 20 crumbler, Figure 9, in having but one range of teeth, and the flexible steel spring extending over them from the joint, as seen in Figure 10, Plate A, about eight inches beyond the extremity of the shaft or handle. This steel spring is over the curve of much greater breadth than those before-mentioned. It is the main spring of a chronometer, and just sufficiently covers the teeth 25 to prevent their wounding the urethra, being filed or ground down from the point where it leaves the curve. It is to be of the same breadth as the others when it enters the silver tube or sheath, and that breadth about three sixteenths of an inch resting on the flat surface of the shaft, which surface is about the same breadth, the sides of the shaft rounding out beyond the flat 30 surface. The joint of this instrument, as seen in Figure 11, Plate A, is made by filing a piece of steel to the exact shape to suit the form of the part into which it is to go as a tongue for the joint. Being thus filed or formed, there is to be about three eighths of an inch left at the end opposite the end of the tongue, and of double the thickness of the chronometer spring before men- 35 tioned, (but of the same breadth that the spring may be let down as far as its own thickness in it, and thus riveted, a continued smooth surface is formed, as if the whole thing had been made from one steel bar. This tongue riveted to its place completes the joint. All the parts entering the urethra and

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bladder are to be spring tempered, the manner of doing which is known to all surgical instrument makers.

Now for a Specification of that division of the apparatus which does not enter the bladder. It is composed of the following parts seen in Plate A, 5 namely, Figures 3, 4, 5, 6, and 7. Figure 5 is not essential to the operation, as will be shewn, it is merely convenient.

Figure 3 is a frame of wood from twelve to twenty inches long more or less according to circumstances, which shall be mentioned. It is an inch and a half broad, (more or less), and about an inch thick. At one extremity of this 10 frame or body of the apparatus, and in the middle of that extremity on its broadest surface, a little groove, about an inch and a half long, is cut (as seen in Figure 3 of Plate A), just sufficient in breadth and depth to lodge an equal length of one of the shafts of either of the three instruments before mentioned. Across this little groove, near its outer extremity, is a little flat piece of 15 steel, about three quarters of an inch long, a quarter of an inch broad, and about a sixteenth of an inch thick. One end of it is screwed down to the wood with a screw that has not its worm or thread quite up to its head, but sufficiently far from it to allow the little flat piece of steel or button to be moved round across the groove to keep down the shaft in its place there, but 20 not to cover the steel spring. This little steel plate or button, after being moved over the shaft lodged in the groove, passes under a small flat steel arm that projects from a small screw, by which it is secured into the wood, as seen in Figure 3 of Plate A). This arm is about as long as the little button or plate is broad. The screw part of this arm (which is at a right angle to the 25 arm) goes about half an inch into the wood and allows the button to come under the arm in contact with it; the arm keeps down the button and secures the shaft of the instrument in the groove. At the extremity of the little groove which receives the shaft of the instrument, a small iron wedge, a little broader than the groove and about half an inch long, is driven down even 30 with the surface of the wood. It serves for better resistance to the extremity of the shaft. At about three eighths of an inch from this wedge, a semi-circular trough, about half an inch deep and an inch wide, extends through the length of the frame, as is seen in Figure 3 of Plate A. At the opposite extremity of this trough an arm or cross piece projects, (as seen in Figure 3 35 of Plate A), through which the trough is continued; this arm and the frame of the trough are made of the same kind of wood, sickamore. The trough is let into the arm or cross piece and they are secured together by little screws, as the Figure shews.

Figure 4, of Plate A, shews a screw of the same kind of wood as the

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Figure 3. It is about three quarters of an inch diameter and nine or ten inches long, more or less, according to the necessary dimensions of the frame and trough, as will be mentioned. At one extremity of this screw, Figure 4, Plate A, a steel hook is screwed into the depth of about three quarters of an inch. The point of the hook stands perpendicularly to the body of the wooden screw. 5

The cylindrical metallic tube, Figure 5 of Plate A, is about nine inches long and three quarters of an inch diameter. It is the cylinder in common use for weighing, having within a spiral metallic spring attached to a graduated scale, that indicates the weight or power of a body acting against the spiral spring, by removing its ordinary movable hook that was used in 10 hooking up meat to be weighed, and applying the present fixed hook screwed in (as seen in Figure 5), and removing the former ring from the other extremity, by which ring the cylinder was suspended in weighing anything. This cylindrical tube is made available in my apparatus for ascertaining the quantum of power exerted on the stone in the bladder for cutting or crumbling 15 it. At the extremity of this cylindrical tube, opposite to where the hook is fixed, there is seen the eye through which the former ring (before mentioned) passed. This eye is the extremity of the graduated scale of power or weight, acting against the spiral spring within the cylinder, and proportionately to the power applied does this scale come out to shew how much that power is. 20

Figure 6, Plate A, is a nut or fly for the purpose of acting on the wooden screw, Figure 4, when that screw is laid in the trough of Figure 2, and projects beyond the arm or cross piece of that Figure. This nut or fly is about four inches and a half long, two inches and a half broad, and half an inch thick, having a hole bored through the centre of it, with a tap to receive 25 the screw, Figure 4 of Plate A. It is made of the same kind of wood as the other pieces.

Figure 7, Plate A, is to act as a rider over the frame, Figure 3 of Plate A, and as such to receive the hook of the screw, Figure 4, through the little hole in it as the rider straddles the trough in Figure 3. The removeable screw 30 that passes through the legs of the rider (as seen in the Figure) serves to keep the rider secure as a slide on the frame. The rider is made of iron or steel; its use is to keep the hook of the wooden screw drawing in a straight line, by preventing it from turning round when it is through the eye of the steel plate that is at the extremity of the flexible steel spring Figure 12. 35 Plate A shews all the parts of the apparatus in appropriate combination for operating on the stone in the bladder. The part that opens in the bladder is represented as if about to close on the stone. In this Figure it is seen that by turning the nut or fly, (Figure 6), it draws up the screw through the arm

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or cross piece. This screw having its hook passing through the eye of the cylindrical metallic tube (Figure 5), and also through the eye or hole of the sliding rider (Figure 7), and the hook of the cylindrical metallic tube passing through the eye of the little metallic plate at the extremity of
 5 the flexible steel spring (as mentioned before and seen in Figures 1 and 2 of Plate A), the turning of the nut or fly draws up the steel spring and closes the instrument on the stone. The power thus applied to cutting or crumbling the stone in the bladder may be very great. The metallic cylindrical tube, Figure 5, Plate A, indicates the power applied, as is seen by
 10 the graduated scale within it coming out at the eye of the tube when the instrument is in use. This index indication of power is evidently not essential to the operation, for if the cylinder (or power gage, as it may be denominated), were dispensed with, as in the Figures of Plate B, and the hook of the screw be passed immediately through the hole in the rider and the
 15 steel plate at the extremity of the steel spring, the power applied will be equally efficient, but unknown.

Directions for using the apparatus.—The directions for using one instrument of the apparatus, say Figure 1 of Plate A, will be equally applicable to the others. The surgeon is to introduce Figure 1 of Plate A
 20 into the bladder precisely as he would a catheter or a sound. Being in, he touches the upper part of the stone with the convex part of the curve of the instrument; this done, he slides the instrument on the stone laterally to the patient until he perceives it to be on the verge of the stone's convexity, he then keeps the instrument there in contact with the stone;
 25 with his left hand he pushes down the flexible steel spring into the bladder sufficiently far to enable him to feel that the moveable portion of the curve has passed below the stone, then by a kind of scooping action with the instrument he incloses the stone between its parts or jaws; feeling that the stone is thus inclosed, he secures the hold of the instrument on it by drawing
 30 up the steel spring tightly with his left hand, then with the thumb, the fore and the middle fingers of the left hand (the thumb below them) he holds securely together the shaft and the flexible spring; with the right hand he takes up or receives from the patient (the only assistant necessary, perhaps) the apparatus as arranged in its parts in Figure 12, Plate A, of course
 35 exclusive of the part in use, and with that hand he applies the little groove in the extremity of the frame, (Figure 3, Plate A), to the extremity of the shaft; then, carefully pressing the shaft into it with his fore and middle fingers, he turns the little steel button over it, and under the little flat steel arm, but not over the steel spring, which must move freely. The shaft being lodged in the

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groove, and the button secured over it, the surgeon—or his assistant, the patient—is to put the eye of the steel plate at the extremity of the spring upon the hook of the cylindrical tube or power gage if that instrument be used, or if not, the eye is to be put upon the hook of the wooden screw, Figure 4, Plate A, after the rider had been secured over that hook, as seen in the two 5 Figures of Plate B, where the cylindrical tube is omitted. All this being done whilst the patient lies on his right side for greater convenience to the surgeon, the apparatus is to be held steadily in the bladder by the patient himself, or any other assistant, whilst the operator turns the nut or fly. For every subsequent cut or crumbling the nut or fly is to be turned back, that the steel 10 spring may be slackened and removed from the hook to allow of its being again pushed into the bladder as at first. The stone is divided or crumbled or grated by turning the nut or fly before mentioned from left to right. If the instrument, Figure 9, Plate A, with the moveable range of teeth, seizes the stone at the verge of its circumference, its grating or biting the stone will 15 be strikingly analogous to a dog's biting the end of a large bone. The two ranges of teeth act as a double grater when the instrument thus seises a stone. The bladder is to be injected through the shaft of the instrument in the manner before stated. After the stone has been cut its new surfaces will absorb the injection more readily than the old one, the stone will thereby 20 become softer, and every subsequent cut of it require the exercise of less power to divide or crumble it. After the cutter has divided a stone into several portions, say six or eight, the crumbler or crusher may be used with very little power to pulverize them for the easy passage of their substance through the urethra. A silver wire is to be used occasionally to keep the canal or groove of 25 the shaft free of obstruction.

What I claim as new in the apparatus, and as my Inventions, and for which I have prayed Letters Patent, are,—

First, the curve of the cutter and of the crumbler, being each of them formed of two entire sections, one section moving on a joint formed by a 30 screw or a rivet fixed into the other section.

Second, those sections of the instruments being formed with edges to cut or teeth to crumble and pulverize the stone.

Third, the groove in the handle or shaft of the instruments for injecting the bladder. 35

Fourth, the application of the elastic steel spring, by means of which the instruments are opened and closed in the bladder.

Fifth, the application of the silver or other metallic tube to keep that elastic steel spring acting properly in its place.

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Sixth, the application of a flexible steel spring, forming a joint, as described in the foregoing Specification, extending over the whole of the convex range of teeth, and then narrowing off to pass through the tube.

Seventh, the application (as described in the Specification) of the wooden
5 trough, screw and nut, as means of applying power.

Eighth, the application of the rider to keep the hook of the wooden screw acting properly in its place.

This is the Specification of my Invention.

10 In witness whereof, I, the said James Lee Hannah, Doctor of Medicine,
have hereunto set my hand and seal, this Twentieth day of November,
in the year of our Lord One thousand eight hundred and thirty-
four.

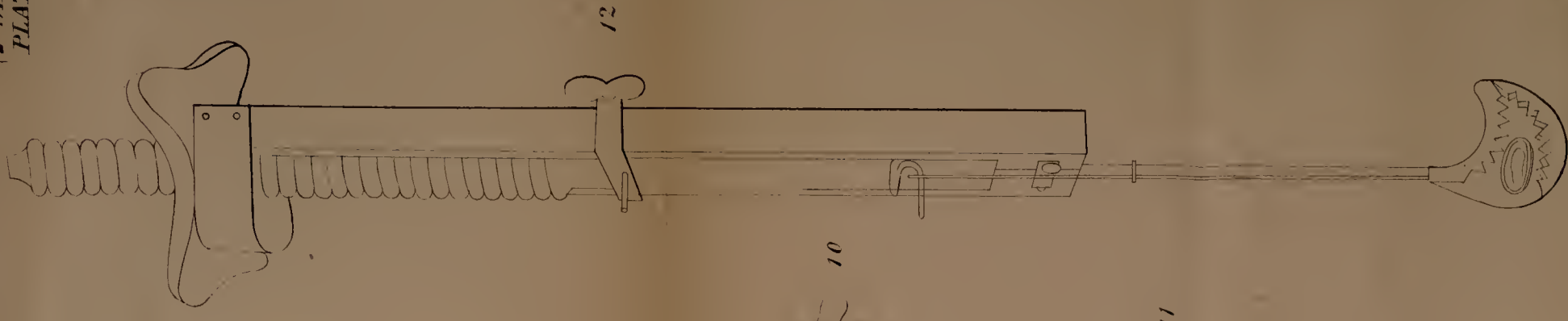
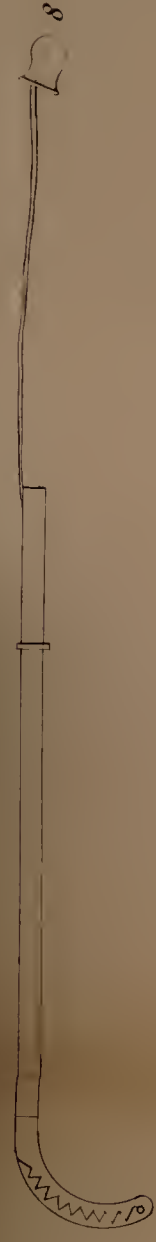
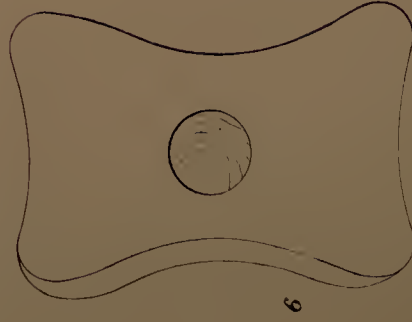
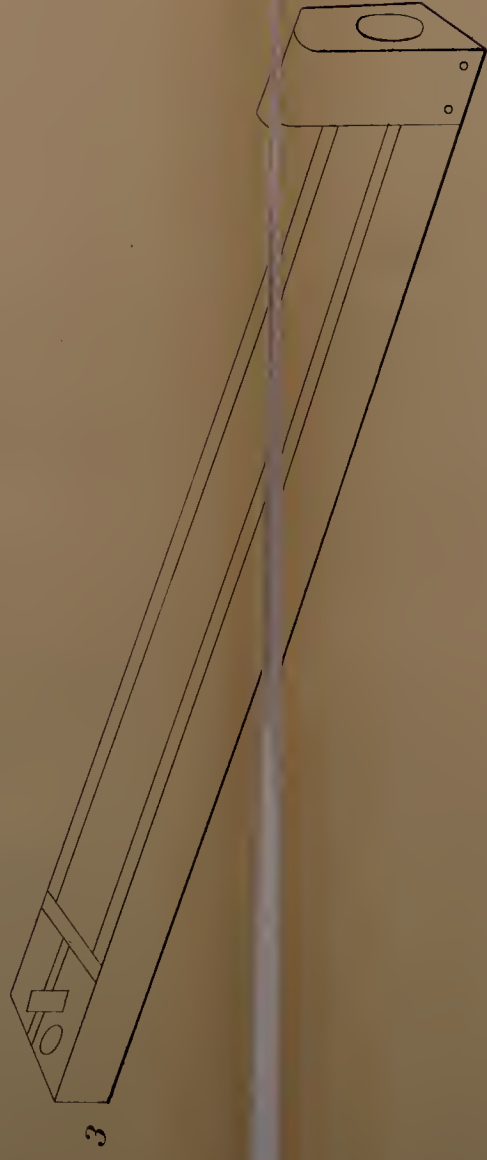
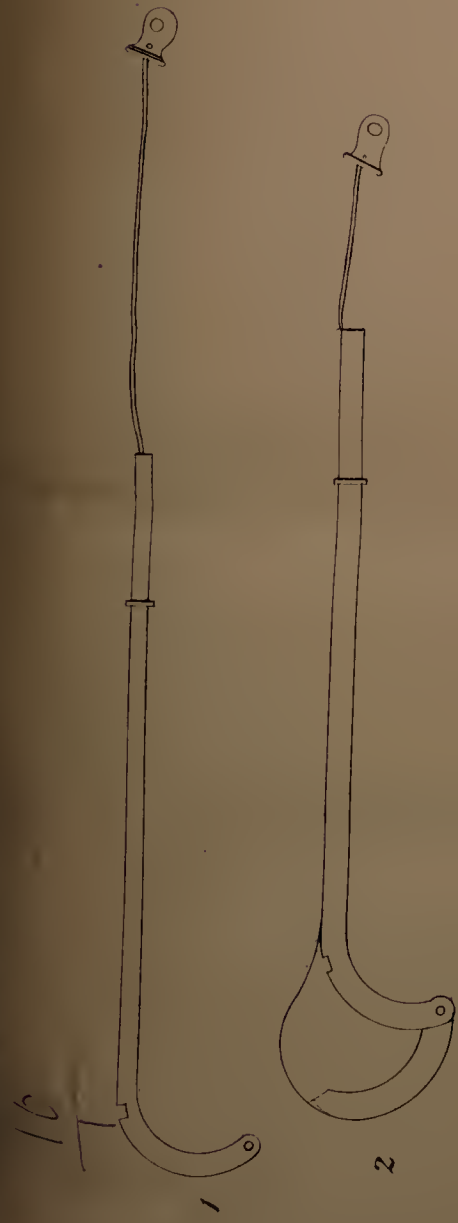
JAMES LEE (L.S.) HANNAH, M.D.

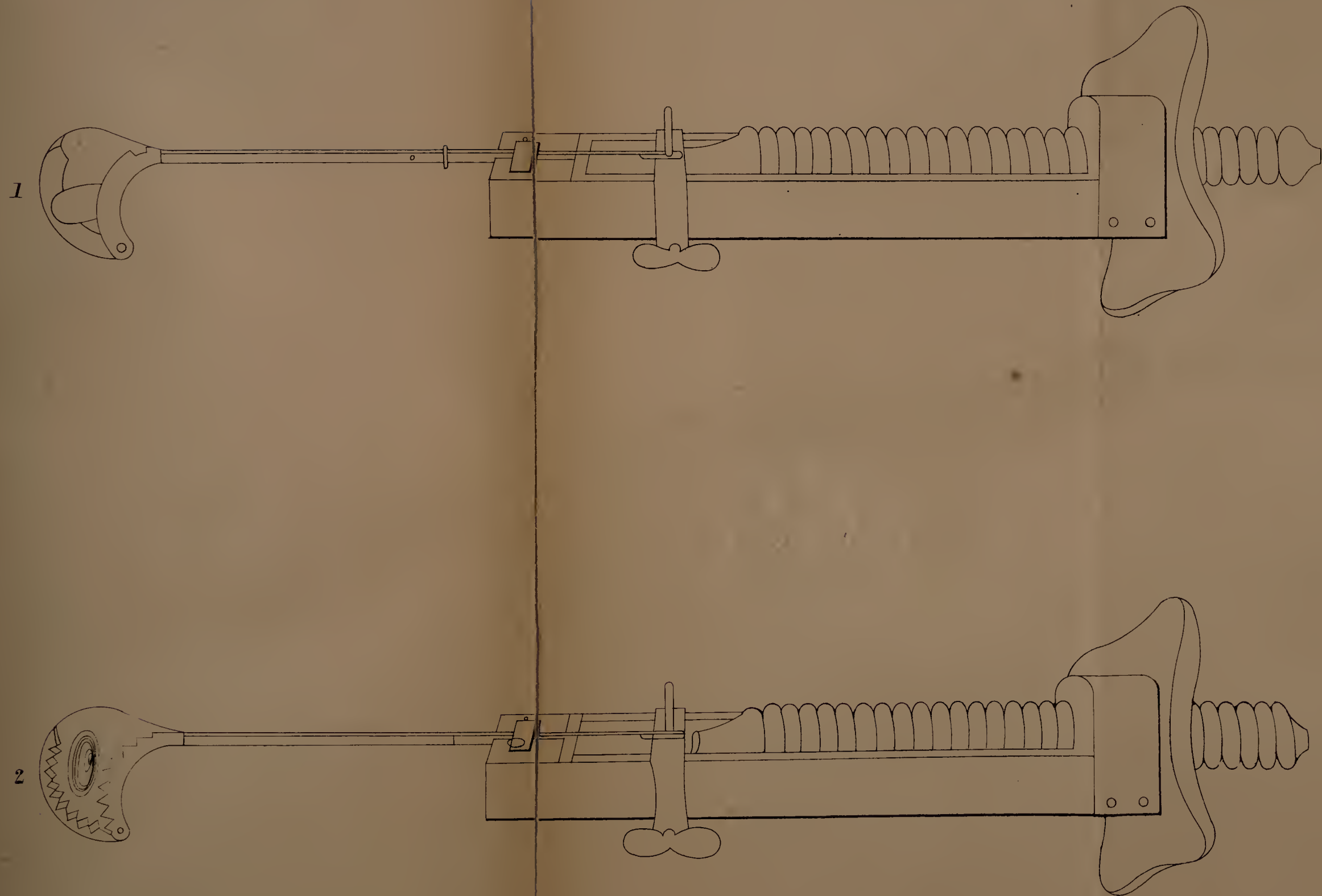
15 **AND BE IT REMEMBERED**, that on the Twentieth day of November, in
the year of our Lord 1834, the aforesaid James Lee Hannah came before
our said Lord the King in His Chancery, and acknowledged the Specification
aforesaid, and all and every thing therein contained and specified, in form above
written. And also the Specification aforesaid was stamped according to the
tenor of the Statute made for that purpose.

20 Inrolled the Twentieth day of November, in the year of our Lord
One thousand eight hundred and thirty-four.

LONDON :

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1857.





The enclosed drawing is colored.

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